We claim:

1. A DNA sequence SEQ ID No. 1 or SEQ ID No. 7 or a DNA sequence hybridizing herewith or a DNA sequence which is homologous to the full sequence or to subsequences, encoding a Synechocystis 2-methyl-6-phytylhydroquinone methyltransferase.

2. The use of DNA sequences encoding a 2-methyl-6-phytylhydroquinone methyltransferase for the generation of plants and photosynthetically active organisms with an elevated tocopherol and tocotrienol content.

3. The use of a DNA sequence SEQ ID No. 1 or SEQ ID No. 7 or a DNA sequence hybridizing herewith encoding a 2-methyl-6-phytylhydroquinone methyltransferase for the generation of plants and photosynthetically active organisms with an elevated tocopherol and tocotrienol content.

4. A method for the generation of plants and photosynthetically active organisms with an elevated tocopherol and tocotrienol content, which comprises expressing, in plants and photosynthetically active organisms, a DNA sequence SEQ ID No. 1 or SEQ ID No. 7 or a DNA sequence hybridizing herewith or a DNA sequence which is homologous to the full sequence or to subsequences.

5. A method for the transformation of a plant, which comprises introducing, into a plant cell, callus tissue, an entire plant or protoplasts of plant cells, an expression cassette containing a promoter, a signal sequence, a DNA sequence SEQ ID No. 1 or SEQ ID No. 7 and a terminator or a DNA sequence hybridizing with this expression cassette.

6. The method for the transformation of plants as claimed in claim 5, wherein transformation is done with the aid of the strain Agrobacterium tumefaciens, electroporation or the particle bombardment method.

7. A plant with an elevated tocopherol and tocotrienol content comprising an expression cassette as claimed in claim 5.

drawings

8. A plant as claimed in claim 7 selected from the group consisting of soya, canola, barley, oats, wheat, oilseed rape, corn, rye, tagetes or sunflower.

9. The use of a DNA sequence SEQ ID No. 1 or SEQ ID No. 7 or a DNA sequence hybridizing herewith as claimed in claim 1 for the preparation of a test system for identifying 2-methyl-6-phytylhydroquinone methyltransferase inhibitors.

10. A test system based on the expression of a DNA sequence SEQ ID No. 1 or SEQ ID No. 7 or a DNA sequence hybridizing herewith as claimed in claim 1 for identifying 2-methyl-6-phytylhydroquinone methyltransferase inhibitors.